

## Introduction

A relational data base management system (RDBMS) developed for the U.S. Geological Survey (USGS), Department of Defense Environmental Conservation (DODEC) program has been successfully used since 1991 by the Wyoming District for a DODEC project at F.E. Warren Air Force Base, Wyoming (Warren AFB Project). This RDBMS consists of INGRES® data bases and integrated data-management procedures that are used to enter, retrieve, display, update, and print information stored in the data bases. The Wyoming District was one of the first USGS offices to fully implement and use the DODEC RDBMS.

## Design and Organization

The DODEC RDBMS is designed to provide data management for most DODEC projects and to meet data delivery and formatting requirements for the U.S. Air Force Installation Restoration Program Information Management System (IRPIMS). The DODEC RDBMS contains 19 data tables and 31 lookup tables. The Wyoming District has added 14 data tables and 10 lookup tables to the DODEC RDBMS to meet specific data-management needs for the Warren AFB Project.

The Wyoming District DODEC RDBMS is divided into two main components: (1) data associated with laboratory chemical analyses of environmental and quality-control (QC)

samples, and (2) data associated with sample locations and field activities.

## Major Types of Data

The Wyoming District DODEC RDBMS contains most of the data collected for the Warren AFB Project. Major types of data stored in the RDBMS include:

- chemical-analysis and QC data
- location and site information
- sample-collection information
- field measurements, such as onsite water-quality properties, portable gas-chromatograph analyses, and ground-water levels
- borehole-drilling information
- lithologic-log information
- well-construction information
- biological data
- assorted reference data.

## Data Entry

Data are entered into the Wyoming District DODEC RDBMS by various methods. The chemical-analysis and associated QC data are loaded electronically into the data base from text files generated by the contract analytical laboratory. The sample location, field measurements, and other field-based data are entered into the DODEC RDBMS using INGRES-based data-entry forms and screens.

## Hardware Needs

The DODEC RDBMS is located on a Data General 530 workstation that has the following specifications: dual processor, 128 megabyte memory, 8-millimeter tape drive, three 1.4 gigabyte (GB) disks, and two 2.0 GB disks. About 4 GB of space is allotted to the INGRES data bases. The INGRES software and supporting-system files require about 2 GB of additional disk space. The workstation resides on the Wyoming District local-area network, permitting access by both personal computers and other Data General workstations.

## Status and Size

The Wyoming District DODEC RDBMS consists of four separate INGRES data bases for the Warren AFB Project. About 1.2 GB of data are stored in these data bases. The largest data table in each of these data bases contains the chemical-analysis data, with a combined total of about 650,000 records.

## Uses and Applications

The Wyoming District DODEC RDBMS has been used successfully for a wide variety of routine and special uses and applications for the Warren AFB Project. Major RDBMS uses and applications include:

- output files converted into FrameMaker® report data tables
- QC reports used for data validation



- structured-query-language and report-writer output used to list and evaluate hydrologic and chemical data
- output files used for statistical-analysis applications and ground-water models
- output files used with various software packages to generate graphs, plots, and maps (AutoCAD®, CorelDRAW™, and geographical information systems)
- data files sent to other Federal, State, and local agencies and contractors (for risk assessment and feasibility study)
- data files formatted for IRPIMS data submissions.

***For more information, contact one of the following:***

*Richard L. Daddow  
U.S. Geological Survey  
Branch of Technical Development  
and Quality Systems  
Box 25046, Mail Stop 401  
Denver Federal Center  
Denver, Colorado 80225  
Phone: (303) 236-1870  
Email: rldaddow@usgs.gov*

*Kathy Voytko Walko  
U.S. Geological Survey  
2617 E. Lincolnway, Suite B  
Cheyenne, Wyoming 82001-5662  
Phone: (307) 778-2931  
Email: kavoytko@usgs.gov*

*Colleen A. Babcock  
U.S. Geological Survey  
520 N. Park Avenue, Suite 221  
Tucson, Arizona 85719  
Phone: (520) 670-6671  
Email: cbabcock@usgs.gov*

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can be obtained by accessing the  
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